POPULAR Computing WEEKLY

5 August 1982 Vol 1 No 16

35p

Hunter-killer on Spectrum

BBC graph plot

Robot Nim

Astro Invaders

Space-saving on PC1211

Spectrum machine code tips

POPULAR
Computing
WEEKLY

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How to submit articles
Articles which are submitted for publication should not be more than 1000 words long

All submissions should be typed and a double space should be left between each line

Programs should whenever possible be computer printed

At present we cannot guarantee to return every submitted article, so please keep a copy

Accuracy
Popular Computing Weekly cannot accept any responsibility for any errors in programs we publish although we will always try our best to make sure programs work.

This Week



Cover illustration by ... C ...

Editorial

The future of home computers lies in telesoftware, according to Nigel Searle, head of Sinclair's computer division That is a bold, not to say prophetic, statement, considering the conspicuous lack of interest so far engendered by Prestel, Ceefax, Oracle et al

Certainly, the development of a low-cost Prestel adaptor (*PCW* July 29) would make a telesoftware scheme financially feasible But, what benefits would it offer to the user?

The most obvious benefit is access to an extremely large data base This would be useful for both educational and business applications

Another benefit is immediacy Programs and other information transmitted via Prestel can be constantly updated

A further benefit is the possibility of interaction with other users It would be possible for clubs and individuals to contact each other over the air The first CB micro may yet appear

But, if telesoftware is to be a success, systems such as Prestel will have to be a great deal more user-friendly than they are at present

Next Week



Survival in post-holocaust London means gang warfare Can you lead your men to victory? You'll find out in Street Alley — a new game for Vic20.

Classified

HAVEN HARDWARE ZX PRODUCTS
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ZX81 (16K, FREE PROGRAM). Send cassette and sae to Nick Godwin 4 Hurkur Crescent Eyemouth Berwick shire

BBC MICRO GAMES Cassette A (Models A & B) Space Invaders (machine code) Dodgems Breakout — £5 (inc) Cassette B (Model B only) Pacman (machine code) 3D Maze — £5 (inc) Both cassettes for £9 (inc) From B Cridland, 8 Bowness Avenue Fleetwood Lancs FY7 8PA

P-E-P The Program Enhancement Package for the ZX81 (16K) 7 fantastic new features for your basic programs. Only £5.95 from R & H SOFTWARE 34 Bourton Road Gloucester

PECMAN & SKYSCRAPER CAPER. Tape 4 high resolution graphics for standard Vic20 £3 or send for games available M Gardner 100 Holmes Chapel Road Congleton Cheshire

ZX81 CONSOLE £17.50 case £27.50 securely mount computer RAM printer recorder No disconnections Sae ZXBS 14 Brookfield Gardens Ryde 0983 65887

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ZX81 VIDEO INVERTER PCB Displays sharp white characters on solid black background screen Kit £4 built £5 will fit inverter £7.50 (includes VAT + P&P instructions) Send cheque/PO to D Fritsch 8 Stanton Road Thelwall Warrington Cheshire WA4 2HS

ZX81, metal case full keyboard 16K, lots of tapes and books £90 Phone Coventry 581935

VIC20 24K RAM cassette unit programmers aid + Ratrace cartridge, plus other software and books, £285 ono 021 747 4752

SHARP PC1211 with printer and recorder £100 Barry 01-434 1365

ZX81 16K with real keyboard number pad and new case various programmes £120 ono 0855 51880

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MZ80 B A and K
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ZX81 16K plus £40 of software Excellent condition £90 Tel 01-504 0842

VIC Intro to Basic £7 Bug-Byte Asteroids Vicmen Alien, Blitz £4 each. 01 741 3361

"STOCKTAKER" provides comprehensive stock control and valuation facilities for the ZX81 £6.50 to D C Roberts 107A Royal George Road, Burgess Hill Sussex

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TRS-80 16K level II cassette recorder green screen VDU covers games books, magazines (hardly used) £320 ono Ring Mike 061 794 7212

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ZX SPECTRUM 48K, new (two weeks old) cash needed, so ring Jeff with offers on Orpington 70428 evenings, or 01-680 222 days

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MZ-80 GAMES/UTILITY CASSETTE COLLECTION Selling at £3 each List SAE 38 South Parade Bramhall Stockport.

MZ-80K SOFTWARE Send SAE for details O Aasme 81 Samuel Lewis Flats Amhurst Park London N16

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VIC20 (UNEXPANDED) Four fantastic games UFO Alien Destroy Pontoon £3.95 D Spencer 230 Low Grange Avenue Billingham Cleveland

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ZX81 with 16K RAM and printer software and Books £110 ono 22 Nursery Close Shoreham Sussex after 6 pm.

ZX81 16K with Defender Asteroids. Cheap at £90 Frinton 2451

BBC SOFTWARE (both models) Cave-Trolls Mini-Adventure, books sound and many hazards £2.50 inclusive S Lintis 80 Gravesend Road Strood, Kent.

VIC 1515 PRINTER + PAPER. Never used — still in box. Bargain £215 Tel Chepstow 5058 anytime

ZX81, Sinclair built 16K RAM pack, Sinclair cassettes numbers 1 2, 3 and 4 All in working order £70 0634 363319 evenings

SPECTRUM SOFTWARE City bomber colour sound animated graphics £3.75 breaking news R Hurley 4 Hurst Gardens Hurstpierpoint, Sussex.

ZX81, Basic Extra Input (flashing cursor prints on screen) read restore data autoscroll routine (prevents errors) £4 M Whitfield 58 Bramblebury Road London SE18 (SAE for details)

SHARP MZ80K 48 K, only five months old, £395 ono Price includes £100-worth software (by Knight's Ltd Aberdeen) on cassette Kane 98 New Road, Bushmills Co Antrim BT57 8YJ

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ZX USERS

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National ZX Users Club Dept PC
44-46 Earls Court Road
London W8 6EJ

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(SAE for ZX catalogue)

ZX81 16K JACKPOT Fruit machine program 15 symbols in view full screen graphics, holds nudge feature nudges up/down collect/gamble on nudges and wins 52 winning combinations Cassette £4.95 P G Curtis 4 Stanwell Road Ashford Middlesex TW15 3ER

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VOLUME ONE (1981) 'Your Computer' issues wanted Ian Kirk, Blackpool 27612

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Enter Sony with a video-linked micro

SONY has made its long-awaited entry into the micro market with the new SMC-70

The machine, with an optional video disc interface, is intended both for conventional computing and video applications

The SMC-70, an 8-bit micro based around the Z80A processor features 64K Ram, 16 colours and hi-resolution graphics The machine uses a version of Basic designed by Sony and the CP/M® operating system

It is the first micro to be designed specifically for use with a video disc player Selected information can be lifted off the Sony video disc system and displayed — its format and content being determined by the user The main application of this will be an educational one, being well suited for presenting all types of learning material

To ensure that this video facility is useful the SMC-70 has advanced graphics capabilities The 16-colour mode will display either four pages of 160 × 100 pixels or one page of 320 × 200 pixels The hi resolution black-and-white mode will display a page of 640 × 400 pixels

Sony's SMC-70 microcomputer with dual disc-drive unit

Other facilities include cassette, IEEE and RS232 interfaces, floppy disc control unit (for Sony's 3in micro floppies), light-pen input and battery back up unit

Among the expansion options are a 256K cache disc unit and a 256K 1M 16-bit CPU adaptor unit

The SMC-70 will go on sale in the US in September The basic model will cost around £750 but a complete system will cost nearer £2500

At present Sony has not announced any plans to sell the machine in the UK

Primary schools get a £9m micro boost

KENNETH Baker, Minister for Information Technology, has announced details of the government's £9m "Micros in Primaries" scheme

Under the plan, the government will contribute half the cost of putting a microcomputer in Britain's 27,000 primary schools The other half of the cost will be met by local education authorities, parent/teacher associations and local interest groups

Only three micros are eligible for the scheme — Sinclair's 48K Spectrum, Acorn's BBC model B with disc interface and Research Machines Link 480Z

Each micro is available with a teacher training package Two teachers from each participating school will be required to attend a short course on the use of micros in primary education

The scheme, which will run from October 1 this year to the end of 1964, is an extension of the existing secondary schools grants system

Some 5200 secondary schools have benefited so far, to the tune of £3m

"Our objective is to enable teachers to get started in giving all young pupils — the five-to ten year-olds — experience with technology, concluded Kenneth Baker



And they're off ... looking for their Spectrums?

Clive shows his pace in Cambridge race

THE first Sinclair Cambridge half marathon, held on July 18, has been won by Ian Thompson

The former British, European and Commonwealth champion completed the course in 1hr 5mins 17secs.

Of more than 1300 hopeful competitors exactly 1000 finished the 13.1-mile route. The race, sponsored by Sinclair Research, was the first of its kind to be included in the Cambridge Festival Calendar

Clive Sinclair and Nigel Searle were among the large contingent of Sinclair staff taking part

Clive finished 699th in a time of 1hr 51min 41sec

The three-lap race through the streets of Cambridge was organised by the city council in conjunction with the Festival Cambridge City council's Brian Allinson said "We were particularly delighted with the very festive crowd which gathered around the course "

Unemployed to learn computing skills

AN Information Technology Centre has opened in Camden, London

At the centre, the first of 10 soon to be opened, 30 unemployed school-leavers each year will be taught a range of computing skills

Hitachi at IBM secrets hearing

HITACHI has announced its intention to "voluntarily appear" before a US court to hear charges relating to the IBM secrets case

It is alleged that nine Hitachi and four Mitsubishi employees were involved in illegal purchases of stolen IBM computer secrets

Both companies deny that they acted illegally

Hitachi itself and its nine employees in Japan have received summonses to attend the hearings These orders issued by the US Embassy in Tokyo were delivered by Japan's Foreign Ministry

No Hitachi executive is expected to attend the hearing at the North California district court in San Jose The company will be represented by one of its US lawyers

A spokesman for Hitachi has said that it will "in no way interfere" with the decisions of its nine employees whether or not to attend the San Jose hearings

Spectrum game

QUICKSILVA has now produced its first Spectrum software game

Space Intruders costs £5.95 and is available from Quicksilva at their new address — 92 Northam Road Southampton

Further QS Spectrum cassettes are to follow shortly

Letters

write to Letters, Popular Computing Weekly, Hobhouse Court, 19 Whitcomb Street, London WC2

Hey! Where's ma Spectrum?

It is nine weeks today since I sent off my order for a Sinclair ZX Spectrum. It is seven weeks since my cheque was cashed.

If, as appears in a recent edition of your magazine, 17,000 Spectrums have been ordered at an average price of say £145, then Clive Sinclair is holding on to £2.465m of other people's money. The interest accruing at Building Society Rates, say 13 per cent, for a seven-week period is over £43,000.

With £10m profit and an additional £43,000 of our money, the least I would have expected would be a letter of explanation.

Michael Diamond
20 Thorncliffe Gardens
Glasgow G41 2DE

Another Beeb fan bytes the dust

I am glad that *PCW* has got nearer the truth about BBC computer deliveries after the totally fallacious story of June 10 that Acorn had cleared its backlog of orders. My order of November 28, 1981 is still outstanding, even though it is a re-order of a requisition made the previous June. Frankly, I don't call a year's delay "clearing the backlog of orders".

I won't bore you with the tale of frustrating phone calls trying to get information, nor of the sadly lacking "customer relations" on the part of a number of Acorn representatives. John Coll did offer to help back in February when there was a need to use the BBC computer to consider its use in a £16,000 computer package for the local comprehensive school. Sadly, the sales department were unaware of the offer when I phoned them in a fit of frustration in May.

In response to their request to send a copy of John Coll's letter so that they could know what was going on, they sent me a cyclostyled form to confirm delivery in June/July.

The local computer committee met last month to consider its deliberations. By this time the school had had a visit from the Acorn caravan to demonstrate the Econet system. It didn't work, even though it stayed in the school for over a week. We were told that there was a fault in the network using BBC computers which had yet to be solved.

In response to a reminder that a rather important order was involved (from the school's point of view, at least) Acorn's representative replied that £16,000 was "peanuts" to them.

I was appalled with this attitude. How insignificant an order for a mere one-off computer must be. Other customers beware! Frankly, even if the problem is only a duff cassette recorder, any reputable firm should surely show concern.

Our committee showed its concern by confirming an order for the latest Nascom System. It actually works and will be installed in July. Despite my firm advocacy for the Acorn BBC computer throughout the committee's deliberations, I could not maintain my support when the company's confused state pulled the rug out from under their own feet.

David Tall
21 Laburnum Avenue
Kenilworth CV8 2DR

While another gets a bit miffed

One, if not the only, frustrating element in purchasing your magazine is that you are too biased to ZX81 and Vic (see *PCW* July 15).

Owning a BBC micro I feel really "had" by the now 35p price tag. So how about fair shares for all, or are you paid by the ZX81 reference?

D Nevard
1 Sands Lane
Carleton-le-Moorland
Lincoln LN5 9HJ

If you look at *PCW* July 22, you will see that we are not biased against the BBC micro. That issue contained a cover story (Voyager on BBC) and three Open Forum programs written specifically for the BBC micro.

However, there are approximately 300,000 ZX81s in the UK as against some 20,000 BBC micros. While we try to provide a balanced coverage of different micros, we also try to reflect the interests of our readers.

Pope is unfair competition

Having read the article in *PCW* June 24, regarding the first ZX Fair to take place outside London, I feel (like many ZX users in the north) that I must comment on the reasons for the attendance being "down to few more than 2000 for the two days".

First of all, having spoken to users who did not even know the show had taken place, I feel that the publicity was very poor. The only advertisement I have seen for the show was a small advertisement for one week in your own magazine. There was no mention of it in *Sinclair User* which I am sure many ZX users read.

Secondly, it was unfortunately held on the worst weekend of the year when, owing to the once-in-a-lifetime visit of Pope John Paul II there was no parking in a 50-mile radius of Manchester (a slight exaggeration, but I am sure it did not help).

As one of the 2000 or so who attended the fair, may I please say do not let it put you off holding another one in the future. We thought it was super, only next time let more people know about it.

S Metcalfe
21 Sherwood Avenue
Radcliffe
Manchester M26 0LE

Upon the merits of competition

Re Mr Robert Lober's slight criticism of the ZX Spectrum in *PCW* July 1, may I reply on behalf of many of us waiting for our Spectrums to arrive.

Even the novices to the computing field, myself included, probably accept that the BBC micro is indeed a fine computer with many good features, and that many people would like to own one. But he has answered his own comparison query by stating that his satisfaction has been met by the expense of £600.

Bearing in mind the basic 16K Spectrum is only £125, one does not seem to get much extra value for the additional £475. Also, how many newcomers can afford this kind of money, however advanced the equipment may be?

Having said that, is not the BBC micro model B approximately £400, if you can get one, that is.

While writing, could I perhaps make a suggestion to the editorial team. Could you make your competitions available sometimes to those of us not yet able to invent programs? There are many of us who buy your magazine who would like to enter these competitions.

Robin Window
18 Easthams Road
Crewkerne
Somerset

Good news from the Beeb, at last

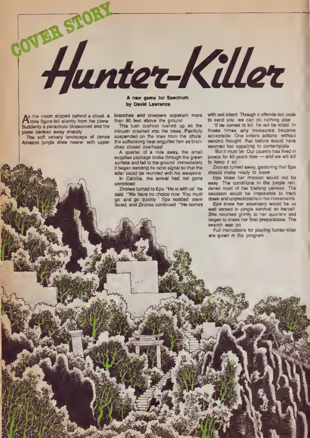
Just a line to send my apologies to your news editor concerning your editorial on Acorn's backlog. I accused him of not getting his facts right when, in point of fact, it was me who had the facts wrong.

Even though the girls at Kettering's telephone department told me that my expected delivery date was September, and that they had not cleared their backlog, yesterday my BBC micro was delivered. Once again, I therefore apologise for the comments I made.

May I also compliment you on a very interesting and topical magazine which I now subscribe to every week.

F Wright
7 Eastbourn Street
Lincoln
Lincolnshire

Please keep your letters as brief as possible



COVER STORY

Hunter-Killer

A new game for Spectrum
by David Lawrence

As the moon slipped behind a cloud a lone figure fell silently from the plane Suddenly a parachute blossomed and the plane banked away sharply

The soft velvety landscape of dense Amazon jungle drew nearer with upper branches and creepers apparent more than 80 feet above the ground

This lush cushion rushed up as the intruder crashed into the trees Painfully suspended on the lines from the chute the suffocating heat engulfed him as branches closed overhead

A quarter of a mile away, the small supplies package broke through the green surface and fell to the ground Immediately it began sending its radio signal so that the killer could be reunited with his weapons

In Catnika, the arrival had not gone unnoticed

Zironas turned to Epa "He is with us' he said "We have no choice now You must go and go quickly ' Epa nodded stern faced, and Zironas continued "He comes with evil intent Though it offends our code to send you we can do nothing else

"If he comes to kill he will be killed In these times any measures become acceptable One orders actions without second thought that before would have seemed too appalling to contemplate

But it must be Our country has lived in peace for 40 years now — and we will kill to keep it so

Zironas turned away, gesturing that Epa should make ready to leave

Epa knew her mission would not be easy The conditions in the jungle rendered most of her training useless The assassin would be impossible to track down and unpredictable in his movements

Epa knew her adversary would be as well versed in jungle survival as herself She returned grimly to her quarters and began to make her final preparations The search was on

Full instructions for playing hunter-killer are given in the program

```
1000 BORDER 0: INK 1: PAPER 7: PRINT AT 10,12;"[illegible]"
1010 INPUT "Do you want instructions? (Y/N)";Q$
1030 CLS
1035 GO SUB 3010
1040 IF Q$="Y" OR Q$="y" THEN GO SUB 2375
1050 GO SUB 2670
1060 REM ************************
1070 REM VARIABLES
1080 REM ************************
1090 LET A=0
1100 DIM M(100,4)
1110 LET C=20
1120 LET C1=0
1130 LET T=0
1140 DIM Q$(32)
1150 LET R1=6-INT (RND*13)
1160 LET R2=6-INT (RND*13)
1170 LET P1=INT (RND*18+1)
1180 LET P2=INT (RND*30+1)
1190 REM ************************
1200 REM INITIAL BOARD
1210 REM ************************
1220 CLS
1230 LET A$="1234567890123456789012345678901": PRINT ,A$
1240 FOR I=1 TO 18: PRINT A$(I): NEXT I
1250 GO SUB 1680
1300 REM ************************
1310 REM INPUT AND DIRECTIONS
1320 REM ************************
1330 INK 0
1335 LET T=T+1
1340 IF T>100 THEN GO SUB 2620
1350 LET Q$=""
1360 PRINT AT 19,23;"MOVE ";T
1370 PRINT AT 21,17;"(0 FOR REVIEW)"
1380 PRINT AT 19,1;"DOWN ";: INPUT M1: PRINT M1
1410 IF M1<19 AND M1>-1 THEN GO TO 1450
1400 PRINT ">OUT OF RANGE": PRINT AT 19,0;Q$: GO TO 1380
1420 PRINT AT 20,0;Q$
1450 IF M1<>0 THEN GO TO 1490
1475 GO SUB 2000
1480 GO TO 1330
1490 PRINT AT 21,0;Q$
1500 PRINT AT 20,1;"ACROSS ";: INPUT M2: PRINT M2
1530 IF M2<31 AND M2>0 THEN GO TO 1570
1540 PRINT ">OUT OF RANGE": PRINT AT 20,0;Q$: GO TO 1500
1570 PRINT AT 21,0;Q$
1580 LET M(T,1)=M1: LET M(T,2)=M2
1600 IF M1<>P1 OR M2<>P2 THEN GO TO 1610
1605 GO TO 1960
1610 LET M3=(M1<P1)-(M1>P1)+1
1620 LET M4=(M2<P2)-(M2>P2)+2
1630 LET D=M3*3+M4
1635 IF D>4 THEN LET D=D-1
1640 LET M(T,3)=D
1650 GO SUB 1680: GO SUB 1850: GO TO 1330
1680 REM ************************
1690 REM PRINT BOARD AND MOVE
1700 REM ************************
1705 PAPER 5: INK 1
1710 FOR I=1 TO 9
1720 PRINT AT I*2-1,1;"■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■"
1730 PRINT AT I*2,1;"■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■"
1740 NEXT I
1745 INK 1: PAPER 7
1750 PRINT AT 19,0;Q$,Q$,Q$
1755 IF T=0 THEN RETURN
1770 PRINT AT M1,M2;CHR$ (143+D)
1780 IF A<>1 THEN RETURN
1800 IF T/E=INT (T/E) THEN PRINT AT 21,0;"[illegible]"
1810 RETURN
1820 REM ************************
1830 REM MOVE INCREMENT
1840 REM ************************
1850 LET P1=P1+R1: LET P2=P2+R2
1870 IF T/E<>INT (T/E) THEN GO TO 1910
1880 LET P1=INT (P1+RND*6+1): LET P2=INT (P2+RND*8+1)
1890 PRINT AT 21,0;"[illegible]"
1910 LET P1=P1+18*(P1<1)-18*(P1>18)
1920 LET P2=P2+30*(P2<1)-30*(P2>30)
1930 RETURN
1960 REM ************************
1965 REM SUCCESS AT LAST
1968 REM ************************
1970 PRINT AT 18,13;"GOT IT"
1980 INPUT "Another game? (Y/N)";Q$
1985 IF Q$="Y" THEN GO TO 1000
1990 STOP
2000 REM ************************
2010 REM REVIEW OF GAME
2020 REM ************************
2030 LET A=1
2040 PRINT AT 19,0;Q$,Q$,Q$
2045 IF C1>=C THEN GO TO 2150
2050 PRINT AT 0,13;"[illegible]"
2060 PRINT AT 0,0;"REVIEW ALLOWANCE ";C;" MOVES"
2070 PRINT AT 19,0;"YOU HAVE USED ";C1
2080 PRINT AT 19,1;"LAST MOVE WAS No. ";T-1
2090 PRINT AT 21,1;"INPUT FIRST No. FOR REVIEW ";: INPUT T1: PRINT T1
2120 FOR J=T1 TO T-1
2130 LET C1=C1+1
2140 IF C1<=C THEN GO TO 2170
2150 PRINT AT 10,4;"[illegible]"
2155 PAUSE 0
2160 GO TO 2000
2170 LET M1=M(J,1): LET M2=M(J,2): LET D=M(J,3)
2210 GO SUB 1680
2220 PRINT AT 19,0;"REVIEW OF MOVE ";J
2230 PRINT AT 21,20;"(0 TO QUIT)"
2260 INPUT Q$: PRINT AT 19,0;Q$,Q$,Q$
2265 IF Q$="0" THEN GO TO 2280
2270 NEXT J
2280 LET T=T-1
2290 LET M1=M(T,1): LET M2=M(T,2): LET D=M(T,3)
2330 GO SUB 1680
2340 LET A=0
2350 RETURN
2360 REM ************************
2370 REM INSTRUCTIONS
2380 REM ************************
2390 INK 5: PRINT AT 0,11;"[illegible]"
2400 INK 0: PRINT '"This is a hunting game. ";"The hunting ground is an 18 by 30 board. ";"The quarry is invisible."
2410 PRINT '"Each turn the quarry makes a ";"secret move. This move does not ";"change during a particular hunt."
2420 PRINT '"The move can be up to six spaces";" up or down and six spaces left";" or right."
2430 PRINT ''"Press any key for more instructions."
2440 PAUSE 0
2450 CLS
2460 PRINT '"Each turn consists of:"
2470 PRINT '"1) An invitation to input your";" estimate of the position of the";" quarry."
2480 PRINT '"2) An arrow will appear in your";" specified square, indicating the";" direction of the quarry."
2490 PRINT '"3) The quarry will move."
2510 PRINT ''"Press any key to continue."
2520 PAUSE 0
2530 CLS
2540 PRINT '"At the start of each turn you ";"have the opportunity to review";" the hunt so far."
2550 PRINT '"This is done by entering 0 when";" the DOWN co-ordinate is called";" for."
2560 PRINT '"You can start the review at any";" previous move but you are";" limited to reviewing 20 moves";" in any one hunt."
2570 PRINT '"These 20 reviews may be taken";" all at once or in batches."
2580 PRINT ''"Any key to start."
2590 PAUSE 0
2600 RETURN
2610 REM ************************
2620 REM HARD LUCK
2630 REM ************************
2640 CLS
2650 PRINT AT 10,0;"SORRY-CAN'T TAKE ANY MORE MOVES."
2660 STOP
2670 REM ************************
2680 REM SET DIFFICULTY
2690 REM ************************
2700 CLS
2710 PRINT ''"There is a difficulty factor";" built into the game."
2720 PRINT ''"This consists of an entirely";" random move every so often."
2730 PRINT '"The difficulty factor ranges";" from 0 to 10."
2740 PRINT '"0 means no random moves at all."
2760 INK 0: INPUT "Please input your desired ";"difficulty factor ";E
2780 LET E=(11-E)*2+2+100*(E=0)
2810 INK 0: CLS : RETURN
3000 REM ************************
3010 REM UDG CHARACTERS
3020 REM ************************
3022 RESTORE
3025 FOR I=1 TO 8
3030 FOR J=0 TO 7
3040 READ B
3050 POKE USR CHR$ (143+I)+J,B
3060 NEXT J
3070 NEXT I
3080 RETURN
3090 DATA BIN 00000000,BIN 01111000,BIN 01100000,BIN 01010000,BIN 01001000,BIN 00000100,BIN 00000010,BIN 00000001
3100 DATA BIN 00001000,BIN 00011100,BIN 00101010,BIN 01001001,BIN 00001000,BIN 00001000,BIN 00001000,BIN 00001000
3110 DATA BIN 00000000,BIN 00011110,BIN 00000110,BIN 00001010,BIN 00010010,BIN 00100000,BIN 01000000,BIN 10000000
3120 DATA BIN 00010000,BIN 00100000,BIN 01000000,BIN 11111111,BIN 01000000,BIN 00100000,BIN 00010000,BIN 00000000
3130 DATA BIN 00001000,BIN 00000100,BIN 00000010,BIN 11111111,BIN 00000010,BIN 00000100,BIN 00001000,BIN 00000000
3140 DATA BIN 00000001,BIN 00000010,BIN 00000100,BIN 01001000,BIN 01010000,BIN 01100000,BIN 01111000,BIN 00000000
3150 DATA BIN 00001000,BIN 00001000,BIN 00001000,BIN 00001000,BIN 01001001,BIN 00101010,BIN 00011100,BIN 00001000
3160 DATA BIN 10000000,BIN 01000000,BIN 00100000,BIN 00010010,BIN 00001010,BIN 00000110,BIN 00011110,BIN 00000000
```





POPULAR Computing WEEKLY Discount Club

SPECIAL OFFER

PCW has negotiated a special discount offer on four of the top games cartridges for the Commodore Vic20. The cartridges are manufactured by Audiogenic.

SAVE £7 on Renaissance

PCW price £17.99 (List price £24.99)

Renaissance is the ultimate Othello package for the Vic20. Use joystick or keyboard control to play against the Vic. There are eight levels of play. During the game you can change sides and playing level, take back moves, set up and play special games. You can even save and recall whole games to and from cassette.

SAVE £7 on Meteor Run

PCW price £17.99 (List price £24.99)

In **Meteor Run** you must pilot your spaceship through the Meteor belt, blasting your way through the rocks and Alien saucers. Similar to an Asteroids game it includes an early warning radar display.

SAVE £7 on Spiders of Mars

PCW price £17.99 (List price £24.99)

In **Spiders of Mars** you are a trapped fly. You must shoot your way across Mars avoiding the dreaded Spiders and the other flying creatures. Accompanied by classical music.

SAVE £3 on Cloudburst

PCW price £16.99 (List price £19.99)

In **Cloudburst** you must save the Earth from the downpour of Acid raindrops and the invasion of the mutant Cloud Hoppers. Speed and skill are essential. With original music and ten levels of play.

To have these top cartridges sent to your home all you have to do is fill in the form below and send it off to *Popular Computing Weekly*.

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Quantity	Cartridge	Price
	Renaissance	£17.99
	Meteor Run	£17.99
	Spiders of Mars	£17.99
	Cloudburst	£16.99
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I enclose a cheque made payable to *Popular Computing Weekly* **Discount Club**, for £ ....

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Address ....

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Send this order form to *Popular Computing Weekly* **Discount Club**, Hobhouse Court, 19 Whitcomb Street, London WC2 7HF

Breathing fire into the Mettoy Dragon

***David Kelly** visits the Patscentre and talks to the designer of the Dragon 32.*

The Patscentre is a unique development facility. For each client they draw on expertise in many disciplines in order to produce an innovative and competitive product.

From the car park the building is invisible. Nearing the top of the steps the long workshop suddenly emerges. It is low-lying and futuristic.

Inside, primary-coloured tubular steel railings and plants vie for attention. Everyone carries an identity card and a bleeper.

It is in this environment that Ian Thomson Bell conceived and developed Mettoy's micro, the Dragon 32.

Mettoy's brief was precise. Ian began work on the project in October 1981. The first prototype was demonstrated to the Mettoy board by Christmas. The Dragon should be on sale in the shops from August 2.

Ian is not unused to working to such tight schedules. That is what the Patscentre is about. At any given time he can be working on up to three such projects, each at different stages of development.

He explains how the design of the Dragon progressed. "We chose Microsoft Basic because the timescale dictated an off-the-shelf interpreter. The 6809 chip was selected because it is the best 8-bit processor.

"As far as the CPU is concerned the design was relatively straightforward. With the 8-bit, the SAM chip and the 6847 you have virtually a home computer in three chips.

"The difficult parts of the design were the Microsoft driver and the video conversion."

The Microsoft driver was developed by Duncan Smeed at the University of Strathclyde.

"When Duncan brought it down," said Ian, "we tried to find out why it was so slow. After all, the 6809 is very fast.

"We looked at the Tandy TRS 80 which also uses the chip and found that it too was comparatively slow. On the first version we designed a For Next loop from 1 to 1000 which took two seconds to run.

"At first we thought it was because the Microsoft Basic was in some way cross-assembled from the Z80 Basic. Then we thought it could be a problem with the internal clock. Neither proved to be the case.

"We looked at the amount of time spent scanning the keyboard. Of the 2ms spent in each run of the loop, 0.7ms was spent in the keyboard checking that keys such as *Break* had not been pressed.

"We tackled it as a logic problem. Instead of scanning *each* key in turn, we designed it to check if *any* key had been depressed. This speeded up the software considerably — that is why the Dragon is so quick."

The problem with the video side of the circuit was that the SAM chip gives an output compatible with the American tv standard — NTSC — rather than the British PAL colour system.

"We were quite tempted to go to ULAs for the conversion chip, but the tight time-scale really precluded that. Instead we took an existing Motorola circuit and redesigned it."

There is a fundamental resolution limit with a conventional tv. At the start of the signal of every tv line scan there is a reference burst. This corrects the incoming line information so that it has the same quality of colour and intensity as the preceding lines.

If the pixel width is less than one cycle of this reference seeking circuit, then the tv will not recognise colour. Thus the resolution limit for colour graphics is set by the tv rather than the micro.

Ian explains, "The Dragon has been designed to operate on this screen limit of 128 x 192 for colour and 256 x 192 for black-and-white."

When at college Ian played in a band and designed a mixing desk. When he left he worked first for BAC and then Neve — a studio equipment manufacturer.

After building mixing consoles for the Who and the Kinks, he returned, briefly, to BAC before joining Patscentre International.

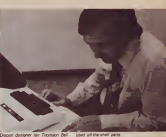
"It is good to see a thing through from the initial design to the finished product," he says. "The advantage of the Patscentre is that it has such a tremendous range of skills, all under one roof.

"One day we will tie up biotechnology with electronics on a molecular level to make a sort of living computer."

The centre is also working on what are called Thick Film Hybrid techniques — a way of producing a complete computer in one chip. "The whole shooting match would then fit in a match-box," says Ian.

Meanwhile, the Patscentre is continuing to extend the Dragon project.

Development is in hand for a mini-floppy disc system for under £250. Next year will also see the launch of an advanced Dragon — with 64K, enhanced graphics and a built-in disc operating system.



Dragon designer Ian Thomson Bell: "used off-the-shelf parts"

What's happening

East London micro users who are interested in getting together to exchange software and perhaps form a club should contact Noorel Haque, 35 Tunis House, Hertford Street, London E1.

Aylesbury ZX Computer Club now hold specific interest meetings (machine-code, hardware etc) each week at Quarrendon Youth Club, Aylesbury. General monthly meetings will recommence in October at Aylesbury College. Contact Ken Knight, 22 Mount Street, Aylesbury, Bucks.

Robot Nim

A and F Software 10 Wiltshire Avenue Longsight Manchester 12
Atom 5K text 0.5K graphics cassette
Price £2.95

This program is based on the old game of Nim where the aim is for two players, in turn, to remove matchsticks from a pile

The winner is the one who picks up the last matchstick.

Nim has always been a standard exercise for student micro programmers All states of the game can be represented as nodes in a binary tree such that the winning strategy is always clear This means a computerised form is just about unbeatable — unless you too, know the technique

"I won I usually do" crows the insufferable Atom at the end of each game in this version Indeed, you little brat, I'll get you next time This is one of the few programs that have caused me to laugh out loud I love it

The matchsticks in this implementation are cuddly little robots rather reminiscent of the Homepride flour men You have the option of setting them up in rows totalling between nine and 35 targets You have the option, too of starting In your move you specify the number of robots to be removed and which row they are in The robot executioner gallops off to do the dirty work for you and then for the computer

Meanwhile the non-exterminated robots visibly quail in fright (A clever technique to stop you working out your strategy) The robot next to be pulverised gains a look of terror and emits a terrified squeak The sound in this program is as brilliant as the vision

"I won I usually do" Indeed I'll wipe that grin off your smug little screen Next time I'll set up the robot rows and really work out a strategy Just didn't let me see those frightened faces, that's all

Summary

A totally brilliant version of Nim Get it, and experience a computer laughing at your incompetence **KJ**

Volcanic Dungeon

Carnell Software 4 Staunton Road Slough Berkshire
ZX81, 16K
Price £4.50 plus 50p p&p

Volcanic Dungeon is one of the better adventure games currently on the market Set in a Tolkeinesque world of elves and dragons you have the task of rescuing Princess Edora from a crystal coffin hidden deep within the Volcanic Dungeon







When the game begins, you will find yourself in the top left-hand cavern You are armed with a sword and a magic ring given to you by the elfin lord Fandhal The ring has two important properties It enables you to absorb strength from opponents that you succeed in killing and it warns you when the evil witch Magrs is powerful or weak

Various treasures in the form of enchanted weapons and defences are scattered about the dungeon But only experience will tell you which weapons/defences will be effective against which enemies

The Volcanic Dungeon is ringed with fiery caverns Death is instantaneous if you enter any of them

Other hazards include unmarked pits Falling into a pit is not necessarily fatal but you will need at least 100 units of strength to climb out of it

You can replenish your water supply from a number of water holes, provided they are unguarded If a water hole is guarded, you will have to kill the guard before you can drink the water

Parts of the Dungeon are only accessible by crossing bridges If a bridge collapses you will have to use a flying carpet or flying potion to reach the other side

Summary

An excellent game at a reasonable price The instructions are among the best I have ever seen There is also a Hangman game on the other side of the tape **BG**

Astro Invaders

John Price 29 Brook Avenue Levenshulme, Manchester
ZX81 16K cassette
Price £3.65

It could have been any one of a thousand streets in a hundred cities

I walked through the clammy fog keeping to the shadows A light glinted weakly from the corner as I approached I could make out a few words "Astro-Invaders superior m/c programming explosive on-screen kill effect"

My attention was held "A new dimension in ZX81 value — only £3.75 screamed at me in neon That clinched it This I gotta see I muttered, as I entered the low doorway

The place was almost deserted Just a pianist doodling on a baby grand two or three cool-looking guys and a couple of sparkling starlets But at the bar WOW! I sidled up to the cassette letting my cigarette dangle from the corner of my mouth "This could be really something I figured

I loaded the program Would it give me what it promised? I could see it had "high-scoring saucers and 'destructible defence shields'

For a while I got an "accelerating attack rate but, in the end, it didn't deliver

I tried to cover a yawn, but the cassette caught my eye It hit me with a few other little games — but they were just window-dressing

The spool ran some more It's final ploy was *Swat*, which drew a momentary flicker of interest from the punters at the bar It almost made it worth my while to stick around After all, the price was cut back so far a bald man might think he needed a trim

But I had places to go — things to do I couldn't hang around all night

It was getting light As I passed the piano I threw a couple of dimes on to the polished keys "Play it again I drawled

Summary

This spool promised a lot but didn't deliver Maybe kiddo *you'd* find the price right. I'll meet it again some day when it's learnt some more tricks Until then, I'll stick with the classier reels **TB**

Hard lesson in store for 'soft' pirates

Roger Pearson explains how the law on software copyright could affect you

A nasty shock could be in store for some home computer software producers. They could, in the near future, find themselves in the High Court accused of copyright piracy.

The past year has seen a flurry of activity at the High Court, in London, as various manufacturers of coin-operated video amusement machines have battled to stop their games being copied.

Various big names in the amusement industry such as Sega, Atari and Williams Electronics have taken legal action against alleged pirates, claiming that their games are protected by copyright. This action has provided an effective remedy against the unauthorised copying that has been going on.

Now it seems the big guns of the amusement industry could well be turned towards the home computer market, where they believe unauthorised copies of their games are being marketed to home computer enthusiasts.

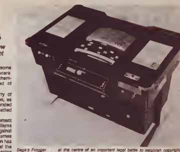
A lawyer who has represented several of the major amusement industry companies, Mr Gordon Day, said: "Companies in the amusement industry are now beginning to turn their attention to the home computer versions of some successful amusement arcade games.

"I think the outcome could well be that some of the people who produce software for home computers could face legal action in the not too distant future."

A number of software writers and companies have been producing their own versions of popular arcade games such as Puckman, unaware that they may be in breach of copyright. But the copyright war in the amusement industry has gone a long way in clarifying certain aspects of the argument over copyright protection for computer programs.

However, this has gone largely unnoticed in the computer world. Micro enthusiasts have failed to recognise the similarity of the basic issues involved when it comes to protecting arcade games from unauthorised copying.

For this reason a look at the amusement industry copyright battle is worthwhile. So far all the hearings in the High Court have been interim claims for injunctions to stop alleged piracy, pending the full trial of copyright actions at a later stage.



Sega's Frogger ... at the centre of an important legal battle to establish copyright

Until July 2, judges had been careful not to give any firm judicial indications that computer programs are actually protected by copyright. However, on July 2, in interim injunction proceedings between Sega Enterprises and John Richards (a video game conversion expert) and his company Trolfame, this was changed.

Granting Sega injunctions stopping Mr Richards and his company from dealing in alleged unauthorised copies of Sega's game 'Frogger', Mr Justice Goulding gave the clearest indication from any judge so far that he believes copyright protection is available for computer programs.

In his judgement he said: "On the evidence before me in this case I am clearly of the opinion that copyright under the provisions relating to literary works under the Copyright Act of 1956 subsists in the assembly code program of the game of 'Frogger'.

"The machine code program derived from it, by operation of a programmed part of the system of the computer called the assembler, is to be regarded I think as a reproduction or adaptation of the assembly code program.

"Accordingly I find that for the purpose of deciding this motion that copyright does subsist in the program."

Sega also claimed that there is artistic copyright protection for the images reproduced on the video screen of the game both during play and during the non playing attract mode sequence. In addition, Sega said that there is further protection for the sequence of visual images under the copyright laws which relate to cinematographic film.

The judge made no ruling on the latter two points, however. He said it was sufficient for the purpose of the injunctions to make a finding on the literary copyright issue.

As a result of this case, some home computer software producers could be caught unawares if they are making unauthorised copies of popular video games.

The first surprise for anyone who is making unauthorised copies of a game is likely to be the worst of all. It will probably come in the form of a knock on the door by solicitors acting for a company alleging their games are being pirated. Those solicitors will be armed with what in legal circles is known as an 'Anton Pillar' order.

This is a court order, granted at the High Court in private and in the absence of the party accused of piracy. It entitles those alleging piracy to go to the premises of those they are accusing, to search them and seize various items of information relating to the alleged infringement and the infringing articles themselves.

The Anton Piller order is a legal weapon widely used in the war against all copyright piracy and particularly in the amusement, film, record and garment industries. Now if the predictions of lawyers in the know are correct, it is a legal weapon which may very soon be aimed at those in the home computer industry.

Classified

Do you want to sell your computer and buy a bigger and better one?

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Open Forum

Open Forum is for you to publish your programs and ideas
It is important that your programs are bug free before you send them in. We cannot test all of them
Contributions should be sent to Popular Computing Weekly, Hobhouse Court,
19 Whitcomb Street, London WC2H 7HF

How to contribute

Each week the editor goes through all the programs that you send to Open Forum in order to find the Program of the Week

The author of that program will qualify for DOUBLE the usual fee we pay for published programs
(The usual fee is £10.)

Presentation hints

Programs which are most likely to be considered for the Program of the Week will be computer printed and accompanied by a cassette

The program will be well documented, the documentation being typed with a double spacing between each line.

The documentation should start with a general description of the program and then give some detail of how the program has been constructed and of its special features.

Listings taken from a ZX Printer should be cut into convenient lengths and carefully stuck down on to white paper, avoiding any creasing

Please enclose a stamped, self-addressed envelope

BBC Scroll

on BBC Micro

If you own or have seen a BBC Micro listing a program, you will know how incredibly fast it is compared with other computers even in the high-res modes where it has to scroll 20K of memory. The main reason for this is that the computer changes the address of each line of screen memory and not the actual contents.

However, since the BBC Micro is such a versatile machine you can perform software scrolls as well. This is required when you define text windows; however, if you define the text window as being the whole screen, eg in mode 4 or 1 VDU28,0 31 39 0

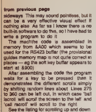
When the screen is scrolled no memory addresses are changed. However the process is much slower than normal. Without changing memory addresses we can use the Rom software to scroll up and down.

You may wish to scroll the screen

to next page

BBC Scroll
by G Jones

```
 5 REM**LEFT+RIGHT SCROLL - G.L.J JUNE 82**
10 MODE0
20 FOR O=0TO3STEP3
30 P%=&A00
40[OPT O
50.LSCROLL
60 LDA #0:STA &80 LDA #&30:STA &81 JSR FLINE \CLEAR FIRST COLUMN
70 LDA #0 STA &80 LDA #&30 STA &81 STA &83 LDA #8 STA &82
80.L1 LDY #0
90.L2 LDA (&82),Y STA (&80),Y INY BNE L2
100 CLC LDA #1 ADC &81 STA &81 STA &83 CMP #&80 BNE L1
105 \CLEAR BOTTOM RIGHT 8 BYTES
110 LDX #8 LDA #0
120.L7 STA &7FF7,X DEX BNE L7
130 RTS
135
140.RSCROLL
150 LDA#&78 STA &80 LDA #&82 STA &81 JSR FLINE \CLEAR LAST COLUMN
160 LDA #0 STA &80 LDA #&60 STA &81:STA &83 LDA #8 STA &82
170.L5 LDY #255
180.L6 LDA (&80),Y STA (&82),Y DEY CPY #255 BNE L6
190 SEC LDA &81 SBC #1 STA &81 STA &83 CMP #&2F BNE L5
195 \CLEAR TOP LEFT 8 BITS
200 LDY #7 LDA #0 .L8 STA &3000,Y DEY BPL L8 RTS
203
205 \CLEAR SPECIFIED COLUMN TO ENSURE NO  WRAP ROUND
210.FLINE
220.L3 LDY #7
230.L4 LDA #0 STA (&80),Y DEY BPL L4
240 CLC LDA #&90 ADC &80 STA &80 LDA #2 ADC &81 STA &81 CMP #&80 BCC L3
250 RTS
260]
270 NEXT
275 REM**DEMONSTRATION OF SCROLLS**
280 S=GET MODE0
290 FOR L=1TO100 DRAWRND(1280),RND(1024) NEXT
295 REM**SET TEXT WINDOW TO MAXIMUM**
300 VDU28 0,31,79,0
310 FOR L=1TO10 VDU30 VDU11 NEXT     REM**SCROLL DOWN**
320 FOR L=1TO20 PRINTTAB(0,31) NEXT  REM**SCROLL UP  **
330 FOR L=1TO10 VDU30 VDU11 NEXT
340 FOR L=1TO10 CALL LSCROLL NEXT
350 FOR L=1TO20 CALL RSCROLL NEXT
360 FOR L=1TO10 CALL LSCROLL NEXT
370 VDU26
```



from previous page

sideways This may sound pointless, but it can be a very effective visual effect if nothing else As far as I know there is no built-in software to do this, so I have had to write a program to do it

The machine code is assembled in memory from &A00 which seems to be used for the RS423 buffer (the provisional guides memory map is not quite correct in places — eg the soft key buffer appears to start at &900)

After assembling the code the program waits for a key to be pressed then it demonstrates the different scrolls simply by shifting random lines about Lines 275 to 360 can be left out, in which case 'call lscroll' will scroll the screen to the left and 'call rscroll' will scroll to the right

See the listing for scrolling up and down VDU26 resets the normal scroll If you want to learn about programming in assembler I suggest one of the things you should do is buy/borrow/steal an Atom manual unless, that is, you want to wait for the proper BBC manual

Reflexee

on Vic 20

This program is for the Vic-20, 3 5K, and it is called Reflexes At the top of the screen is a cross, at the bottom is an x You must get the cross to the x The background is full of balls and if the cross hits the balls the screen will burst into colour with an explosion

If you hit the x the computer will play some music This means the cross made it without hitting a ball

Lines 0-9 print the title page and give a red screen

Lines 11-12 put a coloured setting on the top and bottom of the screen 81-82 and 561-562, are also the same

Line 13 tells the computer to gosub 2000, 2000-2380 is the music and it is used more than once in the program

Lines 14-16 will cause the title page to move down the screen

Lines 27-28 will clear computer and screen

Lines 30-40 are the layout and the quantity of the balls

Line 90 will tell the computer to goto 4000 and it will do this twice Line 4000 is the first sound effect, it is a running scale

Lines 100-1030 are the heart of the program The screen is black with a purple border and the print is white

Lines 167-200 are the key control You can use F1 to end while the game is in play or F7 to reset the game

The balls are drawn by pokes and so is the x and the cross If the cross hits a ball

to next page

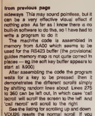
PROGRAM OF THE WEEK

Reflexee
by Ca Saphier

```
0 PRINT"■" POKE36879,42
1 PRINT"■■■■■■■"
2 PRINT"■■■*#*******#*#****"
4 PRINT"■■■   ■REFLEXES■   #"
5 PRINT"■■■               #"
6 PRINT"■■■      BY       #"
7 PRINT"■■■               #"
8 PRINT"■■■  CA SAPHIER   #"
9 PRINT"■■■               #"
10 PRINT"■■■**************#"
11 FORA=0TO21 POKE7680+A,160 POKE38400+A,(AAND7) POKE8164+A,160
12 POKE38884+A,(AAND7) NEXT
13 GOSUB2000
14 FORA=37TO2(0 POKE36865,A NEXTA PRINT"■"
15 FORA=37TO200 POKE36865,A NEXTA PRINT"■"
16 FORA=0TO37 POKE36865,A NEXTA
27 CLR
28 PRINT"■"
29 V=0 M=0
30 E=INT(22*RND(1)+7702)
40 H=INT(22*RND(1)+9164) PRINT"■■■■" POKE36879,42
50 PRINT"*********************"
60 PRINT"# 2-DOWN    4-UP     #"
76 PRINT"# 6-LEFT    8-RIGHT  #"
75 PRINT"# F1-END    F7-RESET #"
80 PRINT"*********************"
81 FORA=0TO21 POKE7680+A,160 POKE38400+A,(AAND7) POKE8164+A,160
82 POKE38884+A,(AAND7) NEXT
90 GOSUB4000 GOSUB4000
93 PRINT"■"
100 POKE36879,12
110 FORA=1TO250
120 B=INT(4222*RND(1)+7724)
130 POKEB,81
140 NEXTA
150 POKEH,91 GETA$
160 POKEE,86
165 POKE36878,15
167 IFA$="■"THEN3200
168 IFA$="■"THEN27
169 IFA$="2"THENPOKE36876,200 POKE36876,0
178 IFA$="2"THENG=22 GOTO250
179 IFA$="4"THENPOKE36876,210 POKE36876,0
180 IFA$="4"THENG=-22 GOTO250
189 IFA$="6"THENPOKE36876,220 POKE36876,0
190 IFA$="6"THENG=-1 GOTO250
199 IFA$="8"THENPOKE36876,230 POKE36876,0
200 IFA$="8"THENG=1 GOTO250
250 M=M+1
260 POKEE,32 E=E+G
270 IFPEEK(E)=81THENGOSUB3000 GOTO550
280 POKEE,90
290 IFE=HTHENPOKE36879,11 GOSUB2000 GOTO600
300 GOTO150
550 POKE36879,8 PRINT"■■■■■■■■■■■■■■■■YOU HIT A BALL"
560 PRINT"■■■ANOTHER GAME (Y/N)"
561 FORA=0TO21 POKE7680+A,160 POKE38400+A,(AAND7) POKE8164+A,160
562 POKE38884+A,(AAND7) NEXT
570 GETG$ IFG$=""THEN570
571 IFG$="Y"THEN590
572 IFG$="N"THEN3200
```

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sideways This may sound pointless, but it can be a very effective visual effect if nothing else As far as I know there is no built-in software to do this, so I have had to write a program to do it

The machine code is assembled in memory from &A00 which seems to be used for the RS423 buffer (the provisional guides memory map is not quite correct in places — eg the soft key buffer appears to start at &900)

After assembling the code the program waits for a key to be pressed then it demonstrates the different scrolls simply by shifting random lines about Lines 275 to 360 can be left out, in which case 'call lscroll' will scroll the screen to the left and 'call rscroll' will scroll to the right

See the listing for scrolling up and down VDU26 resets the normal scroll If you want to learn about programming in assembler I suggest one of the things you should do is buy/borrow/steal an Atom manual unless, that is, you want to wait for the proper BBC manual

Reflexes

on Vic-20

This program is for the Vic-20, 3 5K, and it is called Reflexes At the top of the screen is a cross, at the bottom is an x You must get the cross to the x The background is full of balls and if the cross hits the balls the screen will burst into colour with an explosion

If you hit the x the computer will play some music This means the cross made it without hitting a ball

Lines 0-9 print the title page and give a red screen

Lines 11-12 put a coloured setting on the top and bottom of the screen; 81-82 and 561-562, are also the same

Line 13 tells the computer to gosub 2000 2000-2380 is the music and it is used more than once in the program

Lines 14-16 will cause the title page to move down the screen

Lines 27-28 will clear computer and screen

Lines 30-40 are the layout and the quantity of the balls

Line 90 will tell the computer to goto 4000 and it will do this twice Line 4000 is the first sound effect, it is a running scale

Lines 100-1030 are the heart of the program The screen is black with a purple border and the print is white

Lines 167-200 are the key control You can use F1 to end while the game is in play or F7 to reset the game

The balls are drawn by pokes and so is the x and the cross If the cross hits a ball

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PROGRAM OF THE WEEK

Reflexes
by Ca Saphier

```
0 PRINT"J" POKE36879,42
1 PRINT"J■■■■■■"
2 PRINT"■■■***************"
4 PRINT"■■■*   ■REFLEXES■   *"
5 PRINT"■■■*               *"
6 PRINT"■■■*      BY       *"
7 PRINT"■■■*               *"
8 PRINT"■■■*  CA SAPHIER   *"
9 PRINT"■■■*               *"
10 PRINT"■■■*****************"
11 FORA=0TO21 POKE7680+A,160 POKE38400+A,(RAND7) POKE8164+A,160
12 POKE38884+A,(RAND7) NEXT
13 GOSUB2000
14 FORA=37TO260 POKE36865,A NEXTA PRINT"J"
15 FORA=37TO2## POKE36865,A NEXTA PRINT"J"
16 FORA=0TO37 POKE36865,A NEXTA
27 CLR
28 PRINT"J"
29 V=0 M=0
30 E=INT(22*RND(1)+7702)
40 H=INT(22*RND(1)+8164) PRINT"■■■■■" POKE36879,42
50 PRINT"**********************"
60 PRINT"# 2-DOWN    4-UP      *"
70 PRINT"# 6-LEFT    8-RIGHT   *"
75 PRINT"# F1-END    F7-RESET  *"
80 PRINT"**********************"
81 FORA=0TO21 POKE7680+A,160 POKE38400+A,(RAND7) POKE8164+A,160
82 POKE38884+A,(RAND7) NEXT
90 GOSUB4000 GOSUB4000
93 PRINT"J"
100 POKE36879,12
110 FORA=1TO250
120 B=INT(4222*RND(1)+7724)
130 POKEB,81
140 NEXTA
150 POKEH,91 GETA$
160 POKEE,86
165 POKE36878,15
167 IFA$="■"THEN3200
168 IFA$="■"THEN27
169 IFA$="2"THENPOKE36876,200 POKE36876,0
170 IFA$="2"THENG=22 GOTO250
179 IFA$="4"THENPOKE36876,210 POKE36876,0
180 IFA$="4"THENG=-22 GOTO250
189 IFA$="6"THENPOKE36876,220 POKE36876,0
190 IFA$="6"THENG=-1 GOTO250
193 IFA$="8"THENPOKE36876,230 POKE36876,0
200 IFA$="8"THENG=1 GOTO250
250 M=M+1
260 POKEE,32 E=E+G
270 IFPEEK(E)=81THENGOSUB3000 GOTO550
280 POKEE,90
290 IFE=HTHENPOKE36879,11 GOSUB2000 GOTO600
300 GOTO150
550 POKE36879,8 PRINT"■J■■■■■■■■■■■■■YOU HIT A BALL"
560 PRINT"■■■ANOTHER GAME (Y/N)"
561 FORA=0TO21 POKE7680+A,160 POKE38400+A,(RAND7) POKE8164+A,160
562 POKE38884+A,(RAND7) NEXT
570 GETG$ IFG$=""THEN570
571 IFG$="Y"THEN590
572 IFG$="N"THEN3200
```

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function Good use is also made of three of the sound generators

It may take a little time to enter but it is worth all the effort If anybody is interested the high score held by yours truly is 17.810 The F1 key will move you in a lane and the F3 key will move you out of a lane (or two) This game should provide you with some food for thought

```
5000 FOKE36878,15
5010 FORL=130T0254
5020 POKE36876,L
5030 FORM=1T040
5040 NEXTM
5050 NEXTL
5060 POKE36876,0
5070 POKE36878,0
5080 RETURN
```

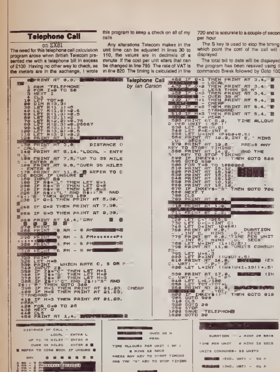
Muncher
by Andrew Berti

```
7 POKE37154,127
8 IFPEEK(37137)<>94ANDPEEK(37137)<>30THEN8
800 IFPEEK(37137)=122ORPEEK(37137)=50THENL=L+D
805 IFPEEK(37137)=110ORPEEK(37137)=46THENL=L-N
810 IFPEEK(37137)=118ORPEEK(37137)=54THENL=L-G
815 IFPEEK(37152)=119THENL=L+H

0 PRINT"J" FORI=7624TO7678 READA POKEI,A NEXT
1 DATA0,112,64,46,26,106,18,14 Y1=36078 S2=V1-3 S3=V1-2 S4=V1-1
2 DATA64,64,120,104,47,61,5,7,0,28,62,125,125,58,28,0,56,124,214,214,254,254,210
,146
3 DATA0,0,28,62,58,54,28,0,24,60,90,126,36,90,66,231,16,0,110,253,253,122,126
6 POKE36869,255 PRINT"■■PRESS ANY KEY" S=3
8 IFPEEK(197)=64THEN8
10 PRINT"J" FORI=8120TO8143 POKEI,160 POKEI+44,160 NEXT N=1
20 O=-1 N=0 LL=1 A=15 B=1 L=INT(RND(1)*4)+1 D=160 P=230 CH=0 M=1
90 XX=-1 YY=0 Y=20 X=10 J=X K=Y C=A D=B POKE36079,152 POKE36020,6
100 PRINT"■■┌──────────────────────┐!"
105 PRINT"■]|           ■          |"
110 PRINT"■]| ┌───────┤■├───────┐ |"
115 PRINT"■]| |         ■        | |"
120 PRINT"■]| | ┌─────┤■├─────┐ | |"
125 PRINT"■]| | |       ■      | | |"
130 PRINT"■]| | | ┌───┤■├───┐ | | |"
135 PRINT"■]| | | |     ■    | | | |"
140 PRINT"■]| | | |  ┌────┐ | | | |"
145 PRINT"■]| ┴ ┴ ┴  |    |  ┴ ┴ ┴ |"
150 PRINT"■]|■■■■■■■|    |■■■■■■■|"
155 PRINT"■]|■■■■■■■|    |■■■■■■■|"
160 PRINT"■]| ┬ ┬ ┬ |■   ■| ┬ ┬ ┬ !"
165 PRINT"■]| | | | └────┘ | | | |"
170 PRINT"■]| | | |     ■    | | | |"
175 PRINT"■]| | | └───┤■├───┘ | | |"
180 PRINT"■]| | |       ■      | | |"
185 PRINT"■]| | └─────┤■├─────┘ | |"
190 PRINT"■]| |         ■        | |"
191 POKE8120,221 POKE8141,221:POKE38840,6 POKE38861,6 POKE8130,230 POKE8131,230
195 PRINT"■]| └───────┤■├───────┘ |"
196 U=8142 POKEU,237 POKEU+38720,6 POKE38850,6 POKE38851,6
197 FORI=U+1TOU+20 POKEI,192 POKEI+30720,6 NEXTI
200 POKEU+21,253 POKEU+38741,6 POKEV1,7 POKE7679,60
210 IFS>1THENPOKE7953,60 IFS>2THENPOKE7954,60 IFS>3THENPOKE7955,60 IFS>4THENPOKE
7956,60
220 IFVV=1THENFORI=1TO6 POKES2,200 FORF=1TO20 NEXT POKES2,0 FORF=1TO20 NEXTF,I
230 IFVV=1THENVV=0
250 POKES2,0 Q=7600+A+22*B HL=7600+C+22*D IFPEEK(Q)=221THEN500
```

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```
260 OP=SC IFCH<>0THENPOKECH,160 CH=0
270 IFPEEK(Q)=221ORPEEK(Q)=192THEN500
295 IFO=61THENSC=SC+10 O=160 POKES3,160
296 IFO=59THENSC=SC+50 O=57 CH=HL POKES3,230
297 IFO=63THENSC=SC+100 O=50 CH=HL POKES3,240
300 POKEHL,O POKEHL+30720,6
301 PRINT"SC, POKE7900,221 SC=SC+1 IFOP<1500ANDSC>1499THENVV=1
302 IFOP<10000ANDSC>9999THENSC=SC-10000 PRINT"     " UU=1
303 IFOP<5000ANDSC>4999THENVV=1
304 POKES3,0 D=PEEK(Q) POKEQ+30720,2 POKEQ,60
310 D=B C=A A=A+D B=B+H IFZX=1THENZX=2 GOTO800
375 IFZX=2THENZX=0 GOTO800
380 IFPEEK(7680+A+22*B)=230THENZX=1
400 ONNGOTO600,650,700,750
410 IFQ=RTHEN1200
420 R=7680+X+22*Y
425 IFRND(1)>.993ANDP=160THENP=63 POKES4,240
427 IFRND(1)>.98ANDP=160THENP=59 POKES4,200
428 IFRND(1)<.2ANDP=160THENP=61 POKES4,180
429 IFP=230THENCO=6
430 IFP=59THENCO=4
431 IFP=61THENCO=5
432 IFPEEK(R)=192ORPEEK(R)=221THEN1050
433 IFP=63THENCO=2
434 POKE7680+J+22*K,P POKE38400+J+22*K,CO
438 P=PEEK(R) POKES4,0 POKER+30720,8 POKER,62 J=X K=Y X=X+XX Y=Y+YY
461 IFJ=CANDK=DTHEN1200
465 IFPEEK(7680+X+22*Y)=230THENGOSUB1000
467 POKES2,135
470 ONMGOSUB850,900,930,960
480 IFVV=1ANDUU=0THENS=S+1 GOTO210
490 GOTO250
500 N=N+1 IFN=5THENN=1
510 A=C B=D
520 IFN=1THENG=-1 H=0
530 IFN=2THENG=0 H=1
540 IFN=3THENG=1 H=0
550 IFN=4THEND=0 H=-1
560 GOTO310
600 B=L*2-1 GOTO410
650 A=L*2-1 GOTO410
700 B=22-L*2 GOTO410
750 A=22-L*2 GOTO410
800 IFPEEK(197)=47THENL=L-1
810 IFPEEK(197)=39THENL=L+1
820 IFL<1THENL=1
830 IFL>4THENL=4
840 GOTO400
850 Y=22-LL*2 RETURN
900 X=LL*2-1 RETURN
930 Y=LL*2-1 RETURN
960 X=22-LL*2 RETURN
1000 IFRND(1)<.1THENRETURN
1005 IFLL>LTHENLL=LL-1
1010 IFLL<LTHENLL=LL+1
1015 IFLL>4THENLL=4
1017 IFLL<1THENLL=1
1020 RETURN
1050 M=M+1 IFM=5THENM=1
1060 X=J Y=K
1070 IFM=1THENXX=-1 YY=0
1075 IFM=2THENXX=0 YY=-1
1080 IFM=3THENXX=1 YY=0
1085 IFM=4THENXX=0 YY=1
1090 GOTO465
1200 POKES2,0 POKES4,220 POKE7680+C+22*D,170
1240 PRINT"BAD LUCK" L=16
1245 L=L-1 POKEV1,L IFL=0THEN1290
1260 FORI=1TO60 NEXTI
1285 GOTO1245
1290 S=S-1 IF6=0THEN1400
1300 FORI=1TO100 NEXTI GOTO10
1400 PRINT"GAME OVER"
1440 RUN6
```



Telephone Call

on ZX81

The need for this telephone call calculation program arose when British Telecom presented me with a telephone bill in excess of £100. Having no other way to check, as the meters are in the exchange, I wrote this program to keep a check on all of my calls.

Any alterations Telecom makes in the unit time can be adjusted in lines 30 to 110, the values are in decimals of a minute. If the cost per unit alters that can be changed in line 795. The rate of VAT is in line 820. The timing is calculated in line 720 and is accurate to a couple of seconds per hour.

The S key is used to stop the timing at which point the cost of the call will be displayed.

The total bill to date will be displayed if the program has been resaved using the commands Break followed by Goto 1000.

Telephone Call
by Ian Carson

```
   PRINT AT 0,0,"
   1 REM "TELEPHONE"
   2 FOR I=0 TO 50
   3 NEXT I
   4 CLS
  10 LET TOT=0
  20 DIM R(3,3)
  30 LET R(1,1)=8
  40 LET R(1,2)=2.4
  50 LET R(1,3)=0.5
  60 LET R(2,1)=2
  70 LET R(2,2)=0.75
  80 LET R(2,3)=0.26667
  90 LET R(3,1)=1.5
 100 LET R(3,2)=0.5
 110 LET R(3,3)=0.2
 120 PRINT AT 1,8,"
 130 PRINT AT 3,0,"     DISTANCE OF CALL -"
 140 PRINT AT 5,14,"LOCAL - ENTER L"
 150 PRINT AT 7,5,"UP TO 35 MILES - ENTER A"
 160 PRINT AT 9,6,"OVER 35 MILES - ENTER B"
 170 PRINT AT 11,0," REFER TO CODE BOOK IF UNSURE "
 180 INPUT R$
 190 IF R$="L" THEN LET Q=1
 200 IF R$="A" THEN LET Q=2
 210 IF R$="B" THEN LET Q=3
 220 IF R$<>"L" AND R$<>"A" AND R$<>"B" THEN GOTO 180
 230 IF Q=1 THEN PRINT AT 5,30,"
 240 IF Q=2 THEN PRINT AT 7,30,"
 250 IF Q=3 THEN PRINT AT 9,30,"
 260 PRINT AT 14,4,"DAY
 270 PRINT
 280 PRINT "8 AM - 9 AM
 290 PRINT "9 AM - 1 PM
 300 PRINT "1 PM - 6 PM
 310 PRINT "6 PM - 8 AM
 320 PRINT
 325 LET H=0
 330 PRINT "WHICH RATE C, S OR P"
 340 INPUT Z$
 350 IF Z$="C" THEN LET H=1
 360 IF Z$="S" THEN LET H=2
 370 IF Z$="P" THEN LET H=3
 380 IF Z$<>"C" AND Z$<>"S" AND Z$<>"P" THEN GOTO 340
 390 IF H=1 THEN PRINT AT 21,23,"CHEAP"
 400 IF H=2 THEN PRINT AT 21,23,"STANDARD"
 410 IF H=3 THEN PRINT AT 21,23,"PEAK"
 420 FOR O=0 TO 26
 430 NEXT O
 440 CLS
 450 PRINT AT 1,4,"
 460 IF Q=1 THEN PRINT AT 3,4,"          - LOCAL"
 470 IF Q=2 THEN PRINT AT 3,4,"          - LESS THAN 35 M"
 480 IF Q=3 THEN PRINT AT 3,4,"          - OVER 35 M"
 490 IF H=1 THEN PRINT AT 5,4,"          - CHEAP"
 500 IF H=2 THEN PRINT AT 5,4,"          - STANDARD"
 510 IF H=3 THEN PRINT AT 5,4,"          - PEAK"
 520 PRINT AT 8,0,"   TIME ALLOWED PER UNIT ( SP )"
 530 LET E=R(H,Q)
 540 LET P=E-INT E
 550 LET U=INT (P*60+0.5)
 560 PRINT AT 10,9,INT E," MINS ",U," SECS"
 570 PRINT AT 12,0,"   PRESS ANY KEY TO START TIMING"
 580 PRINT AT 14,0,"   AND THE "S" KEY TO STOP TIMING"
 590 IF INKEY$<>"" THEN GOTO 600
 595 GOTO 590
 600 FOR T=0 TO 1000000
 610 PRINT AT 18,12,"
 620 PRINT AT 18,12,"
 630 PRINT AT 18,12,"
 640 PRINT AT 18,12,"
 650 PRINT AT 18,12,"
 660 PRINT AT 18,12,"
 670 IF INKEY$="S" THEN GOTO 700
 680 NEXT T
 700 CLS
 709 PRINT AT 0,0,"
 710 PRINT AT 1,0,"
 71_ PRINT AT 2,0,"
 720 LET C=T/265.5
 730 LET D=C-(INT C)
 740 LET D=INT (D*60)
 760 PRINT AT 6,0,"   DURATION - ",INT C," MINS ",D," SECS"
 770 PRINT AT 8,0,"TIME PER UNIT ",INT E," MINS ",U," SECS"
 780 LET W=INT (1+(C/E))
 790 PRINT AT 11,0,"UNITS CONSUMED- ",W
 795 LET U=4.3
 800 LET P=INT ((U*W)+.5)
 810 PRINT AT 14,0,"       (EXC. VAT) - ",P," P"
 820 LET L=INT ((W*(U*1.15))+.5)
 830 PRINT AT 17,0,"       (INC. VAT) - ",L," P"
 840 LET L=L/100
 850 LET TOT=TOT+L
 860 PRINT AT 21,0,"          £ ",TOT," P"
 900 IF INKEY$<>"" THEN GOTO 910
 905 GOTO 900
 910 CLS
 920 GOTO 20
 950 STOP
1000 SAVE "TELEPHON"
1020 GOTO 20
```

Putting more byte into the mini-micro

***Elizabeth Wald** explains space saving techniques on Sharp's PC1211.*



Sharp's PC1211 — the secret is to use variables efficiently

The Sharp PC1211 is a remarkable computer for its size but it does have one major disadvantage — a mere 1424 bytes of memory However with careful programming this can be overcome

It is important to use variables efficiently to store data for programs as this will reduce the number of variables required and often the length of the program Each variable can store up to ten digits plus an exponent and signs Therefore if five two digit numbers need to be stored they can be held in one variable as a decimal fraction The routine needed to store this information is

```
A(x)=A(x)+E−m y+a          (r@ E=exponent symbol)
```

Where A(x) is the variable for storage m is the number of digits (in this case two), y is the position within the variable and a is the number to be stored (m*y must not exceed 10) For example

```
10.A=12 Y=2 A(30)=A(80)+E−2 Y+A
```

Conversely, the following routine will extract the data and produce the result in A

```
A=INT (Em y*A(x)).A=A−Em*INT E−mA
```

eg

```
10.A=INT (E2 Y*A(50)).A=A−E2*INT E−2A
```

Storing the data as a decimal fraction often makes handling easier, although there are exceptions Also, it is sometimes advantageous to store a commonly used number as the integer part of the variable — especially if it is handled differently to the data stored in the fractional part It will therefore be easier to access by using the *Int* function

One other way of saving time is to use one of the variables W Z as the control variable in a *For*   *Next* loop This will reduce the time taken for the loop to be performed by 0 05 seconds per iteration The reason for this is that these four variables are stored in the same memory chip as the *For*   *Next* stack and are therefore slightly quicker to access

On a similar note Z=M is about 0 02 seconds faster than A=M and M=A is about 0 02 seconds faster than M=Z. It therefore pays to have the higher variable on the left of an assignment and the lower variable on the right This does not apply to variables above Z, which seem to take longer

As space is so precious on the PC1211, it is essential to ensure that each line of program does not require more steps than are necessary

The first way in which this can be achieved is by using the key words efficiently Key words are stored as one step each irrespective of their length It therefore may be advantageous to use them as prompts for *Input* statements or in *Print* statements

We may decide on the prompt

```
10 INPUT  ENTER A LETTER  X$
```

This will occupy 23 steps (two for the line number one for the *Input* statement, 19 for the other characters and one for the *Enter* key) If we replace the word *Enter* by the key word *Input* we reduce the number of steps by five To do this key in

```
10 INPUT INPUT       ENTER
```

Then insert an inverted comma before the second *Input* and complete the line As an added bonus, the space is automatically inserted after *Input* One word of warning — do not try to enter too many words as unexpected results may occur

```
10 INPUT INPUT A LETTER  X$
```

produces

```
10 INPUT INPUT ALET TER  X$
```

Some key words can be omitted *Then* is totally superfluous and the Rem command does not work very well as the comment must be enclosed by inverted commas If spaces are required within *Let* can also be omitted in all circumstances bar one The only occasion when it is required is after a numerical test in an *If* statement

```
10 IF A=5LET C=12
```

But note

```
10 IF A$= YES B=2
```

is a valid statement Despite the description given in the manual for the *If* statement

Other ways of saving space may seem a little unnecessary but they may make all the difference on a long program Lines should be as long as possible as line numbers are stored in two steps plus one for the *Enter* key at the end of the line, whereas the separating colon will occupy only one step

Logic statements are particularly useful in saving space These take the value 1 if true and 0 if false and can be used to reduce the need for complicated *If* statements which have the disadvantage that the next statement will need to be on the following line They can also save time when assigning values to variables

An example would be when directions have to be entered during a game The numerical keyboard can be used to represent the directions by using 5 as the base position, and the other keys to represent moves in relation to it. Thus 8 will be up or north, 6 right or east and so on around the keyboard

If the variable D is used to enter the direction the following can be used to assign the changes in the co-ordinates to variables X and Y

```
X=(D=6)−(D=4) Y=(D=8)−(D=1)
```

Logic statements can also be used to perform the same functions as *On*   *Goto* and *On*   *Gosub* in standard Basic

```
Standard ON X GOTO 180,180,230
PC1211 GOTO 180−50*(X=1)+50*(X=3)
```

Space can also be saved by utilising the fact that pressing *Enter* alone in an *Input* statement, will automatically send the computer to the next line This saves the need for an *If* statement for example by entering Y for yes and *Enter* for no Defined keys can also be used in a similar way to transfer control to other parts of the program

Spectrum

Learn to eat as much as you can

Sam Goodwin presents some machine code tips and a new game called snake.

Although lower case lettering often improves programs it can also lead to trouble Some programs will act on the upper case letter A being pressed but they will not recognise lower case a as being the same To avoid this problem on the ZX Spectrum you can either test both conditions

```
100 LET I$=INKEY$
110 IF I$= A OR a THEN
```

or switch on the CAPS LOCK in the program

```
100 POKE 23658 8   REM CAPS LOCK ON
110 IF INKEY$   A  THEN
POKE 23658 0 will switch CAPS LOCK OFF
```

The one graphics command I miss is a *Plot* 23 45 *To* 67 89 To do this on the Spectrum you always need to know where the end point is in relation to the starting point This is because the command used for drawing lines (*Draw*) will act from the last recorded point (The above instruction would be entered as PLOT 23 45 DRAW 44 44)

The following program sketches a fine system of spirals by subtracting the previous plot position from the new one so lines can be joined as absolute coordinates

```
10 LET X=23677 LET Y=23678
20 PLOT 128 88
30 FOR T=0 TO 377
40 LET R= SIN (T* 3.4)
50 DRAW SIN T*R*88+128-PEEK X,
COS T*R*88+ 88 PEEK Y
60 NEXT T
```

Machine Code

All the registers can be used except for the HL pair If you are going to change their contents during the program it is wise to restore their original contents before returning to basic

For machine code that requires critical timing such as printer output and sound effects it may be necessary to disable the clock and keyboard scans This is done with the DI instruction (Disable interrupt, code 243) The keyboard scan must be Enabled code 251, before returning, otherwise the system will hang when a keyboard input is required

This feature could be used to protect programs from being copied as disabling the break key would make it impossible to stop the program without switching the computer off

Instructions can be stored in the user definable graphics memory area This would allow the program to be retained even after the *New* command

The following machine code program does a smooth horizontal scroll from right to left along the middle of the screen

```
    ld SC window size
    ld HL,lowest point
→rl (HL)
    dec HL
    djnz →
    dec C
    jr NZ →
    ret
```

The machine code could be entered in the following way

```
10 FOR A=USR "S" TO USR "U"
20 INPUT B
30 POKE A,B
40 NEXT A
```

RUN

```
1 8 8 33 255 79
203 22 43 16 251
13 32 248 201 8 8
```

(The information has been stored in an area that will remain unaffected by the instruction NEW)

NEW

```
10 FOR A=0 TO 20 STEP 1
20 PLOT 256 SIN A*30+88+USR USR S
30 NEXT A
40 CLS  LIST  LIST
50 LET A  USR USR  S
60 GOTO 50
```

The above program should produce a gently moving sine wave that glides across the screen and then display the program rolling the middle section smoothly from right to left

The one bug I have found in the Spectrum is hardly worth worrying about In fact it could prove to be beneficial

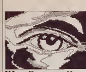
It appears that when a *Control* H (back space) is printed at the beginning of a line the previous line loses one of its bytes The idea of being able to edit a program while it is being Run offers tremendous potential, but somehow I do not think it was an intended feature

Finally I have devised a game called Snake You are a slowly growing snake, kept in a confined space The object of the game is to eat as much of the food as possible while avoiding the obstacles

When entering this program it is important to type in line 50 with exactly 33 spaces in the *Print* statement The character printed in lines 186 and 230 is a user definable A.

```
   5 BRIGHT 0  OVER 0
  10 FOR A=USR "A" TO USR "A"+7
  20 POKE A,60  NEXT A
  40 LET I=0  LET P=7  INK I  PA
PER P  CLS   GO SUB 500
  50 LET B=0  BORDER B  PAPER B
 PRINT "
  60 FOR N=1 TO 20  PRINT AT N,0
1;"  ";  NEXT N  PRINT AT 21,31;"   PAPER P
  70 LET FOODC=2  LET ROCK=1
  80 LET SNAKE=4  LET FOOD=P*8+F
OODC  POKE 23658,8  REM CAPSLOCK
 100 LET LAND=P*8+I  LET MX=1  L
ET MY=0
 110 LET S=1  LET X=9  LET Y=6
 120 DIM X(250)  DIM Y(300)
 130 FOR N=1 TO S
 140 LET I$=INKEY$
 150 IF I$="N" THEN LET MX=-1  L
ET MY=0
 160 IF I$="M" THEN LET MX=+1  L
ET MY=0
 170 IF I$="Q" THEN LET MY=-1  L
ET MX=0
 180 IF I$="A" THEN LET MY=1  LE
T MX=0
 185 LET X=X+MX  LET Y=Y+MY  LET
 A=ATTR (Y,X)
 186 IF Y<22 THEN PRINT AT Y,X;"A"
 187 IF A=FOOD THEN LET S=S+6  GO TO 200
 188 BEEP .01,5/4
 190 IF A<>LAND THEN INPUT "  Yo
u have  CRASHED ";A$  RUN
 200 PRINT AT 0,0; PAPER 0;" SCO
RE = "; INT S*10
 210 PRINT AT Y(N),X(N); INK I;
PAPER P;" "
 220 LET X(N)=X  LET Y(N)=Y
 230 PRINT AT Y,X; INK SNAKE;"A"
 240 NEXT N
 245 PRINT AT RND*18+5,RND*28+5;
 INK FOODC;"■"
 248 PRINT AT RND*21+.5,RND*25+.
5; INK ROCK;"▄"
 250 LET S=S+RND*5
 260 GO TO 130
 500 PRINT AT 1,0;"SNAKE______"' ,"By
Sam Goodwin"
 510 PRINT ''' You are a snake a
nd must try toeat the food but a
void hitting anything else."
 520 PRINT '" ▄ - Rocks  , ■ -
Food"
 530 PRINT '''  To move Press  Q
 to go Up'  N-Left,M-Right &
A to go down"
 600 INPUT a$  CLS  RETURN
```

Sound & vision



It's all a question of values, ain't it?

This is a simple yet effective program for the BBC micro model B, to show the graphs of various equations. The equation is typed in the form Y=F(X). The computer then asks for what values of X you wish to equate Y with.

If you press *Return* without entering any values, the program will default to plotting over the whole range of −640 to +640. Note that the origin is in the centre of the screen.

The computer will draw the axis in white, marking them in steps of 100. It will then draw the original equation in blue, then scale it up or down as appropriate and draw it again in yellow.

However, funny things can happen if very large Y values are encountered so try and keep the values sensible.

Program notes

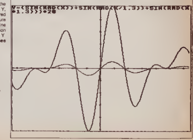
Line 70 shifts the graphics origin from 0,0 to 640,512 IE in the middle of the screen, so that negative values of Y are plotted directly.

Variable D is the scaling factor; after the first plot, M contains the largest value of Y, and D=512/M sets D to the required scaling value. Just in case you are not sure what the EVAL in line 170 does, imagine that A$="2*X" and X=2 — the instruction Y=EVAL(A$) assigns the number 4 to Y.

Gwynfor Jones

Graph plot
by Gwynfor Jones

```
  5 REM**GRAPH PLOT - G.L.J JUNE82**
 10 MODE7
 20 D=1:M=0:C=1
 30 INPUT"Y="A$'"FOR VALUES OF X FROM "S'"TO "F
 40 IF S=0 AND F=0 S=-640:F=640
 50 MODE1:PRINT"Y=";A$
 60 VDU19,1,4,0,0,0
 70 VDU29,120,2,0,2
 80 REM**DRAW AXIS**
 90 MOVE-640,0 DRAW640,0:MOVE0,-512:DRAW0,512
100 FOR L=-700TO700STEP100:MOVEL,-4:DRAWL,4:NEXT
110 FOR L=-600TO600STEP100 MOVE-4,L:DRAW4,L NEXT
120 REM**MAIN LOOP**
130 GCOL0,C
140 X=S:MOVES,EVAL(A$)*D
150 FOR X=S TO F STEP4
160 IF X=0 GOTO210
170 Y=EVAL(A$)*D
180 IF Y>65500 OR Y<-65500 GOTO210
190 IF Y>M M=Y
200 DRAWX,Y
210 NEXT
220 IF C=2 G=GET:RUN
230 D=512/M:C=2:GOTO 130
```



Contribute!

You can share your own favourite Sound or Vision programs with other readers by sending lists with explanations to us at *Popular Computing Weekly*.

WRITE TO: Sound & Vision, Popular Computing Weekly, Hobhouse Court, 19 Whitcomb Street, London WC2 7HF

Peek & poke

Peek your problems to our address. Ian Beardsmore will poke back an answer.

BUDDING MICRO STAR NEEDS SCREEN TEST

Tony Johar of Cambridge Road, Hounslow, Middlesex, writes

Q **I cannot decide which television or monitor to buy for my ZX Spectrum. I have been informed that it is possible to connect a colour monitor to the Spectrum using the existing port. Is this correct and does the Spectrum give out a PAL signal?**

There are three types of Visual Display Unit that I am thinking of buying. The first is a Sony Trinitron television which is meant to be good for computers. The second is a Portatel Luxor 14in monitor, which is a cross between a television and a monitor, and has PAL and RGB inputs. I am told that it works better than an ordinary television because it does not rely on the internal modulator.

Or, should I go the full swing and buy a proper monitor? But, I am not sure if I really need it since the Spectrum does not give out the extremely high resolution graphics of the BBC computer. Will a proper monitor give me a significantly higher quality to justify its purchase, bearing in mind that the Luxor can be used as a television as well?

A This is the sort of area where one can end up spending a lot of money for little appreciable gain. A question you must ask yourself is whether or not it is wise to spend £175 on a computer and then £300 on a monitor? The Spectrum gives out a PAL signal and is compatible with any PAL UHF colour, or black and white set.

The Sony Trinitron does make a reasonable monitor for computers, but there are other sets which are much better. No one can doubt the quality of television picture that the Trinitron produces but if you are looking for a good VDU facility as well then I would advise against buying it.

Portatel were very helpful when I got in touch with them, and though they had not had a Spectrum on a Luxor, they had had very good results on their Hitachi monitors.

The Luxor has the advantage of being compatible not only with European PAL standards but also the US NTSC specification which make it very versatile. It can be used on most of the popular home computers and I am sure that it would enhance the Spectrum. However £300 is a lot of money to pay for a monitor.

One alternative, if you are not sure about how much computing you are going to do in the future, is to buy a cheap secondhand colour set and find an electrician to take the various circuits that accept and amplify the broadcast signal. Replace the signal amplifier circuit, the tuner circuit, et al, with a fixed frequency oscillator circuit. This would give you in effect a monitor at a much lower price.

However, one word of warning. This is an option that you can take only if you know a good electrician. It would be very easy for someone to bodge a job like this and leave you in a worse state than before. Allow at least £50-£75 for the secondhand television and £20-£40 for the work.

REMARKABLE HELP FOR POOR HUMANS

Dafydd Davies of Cynwyl Elfed, Dyfed, writes

Q **Could you please clarify a point for me. A friend says that Rem statements are ignored by computers. If this is so, why are Rem statements used in programs? Also I am interested in buying a Vic30. Could you tell me if Vic30 programs will *Run* on it?**

A Essentially your friend is right, a computer does not take any notice of a Rem statement. Rem is short for remark, and is there to help us poor humans through the complexities of programming. If used in a long program, they act as headings for particular routines within the program. For example, if you have written a Breakout type program you might have the statement Rem "SET UP WALL" at the start of the section that does just that. If when you come to *Run* the program the wall does not work properly, then the Rem will help you find the section which is at fault.

As to the question of the Vic20, and the Vic30 programs being compatible, until we actually get a machine we cannot be absolutely sure. It seems unlikely that the two will be directly compatible, because it is very improbable that the memory locations will be the same.

Also, the Vic10 has a reduced version of Basic, with no *Dim* statements. As the Vic30 is a closer relation to the Vic10 than the Vic20, it is possible that it will have this reduced Basic as well. So, any program on the Vic20 which uses a statement that is not available on the Vic30 will not *Run* without some sort of modification.

AVOID MAKING A BOOB WITH THE BEEB

Mark Middleton of Cannon Hill Road, Coventry, writes

Q **I have ordered a BBC micro model B. After a delay of five months, I expect it to be here soon. My friend has just bought a synthesizer, and we wondered whether or not we could connect them together. If so what port on the BBC should I use, and what sort of ribbon cable should I buy?**

Also, I have had difficulty in getting *Popular Computing Weekly* in Coventry. Can you tell me where to get it, and are there any back issues available?

A You will by now have read in *Popular Computing Weekly* about the delays in the model B, though the Beeb at last seem to be catching up on the backlog.

You do not say what sort of synthesizer your friend has, nor what sort of I/O ports it has. The only synthesizer I have had any experience of is the Roland C100 series. From what I can remember all the internal patching on that was by means of Jack plugs and, apart from the speakers, external access was the same. This would mean that there was no directly compatible port on the BBC micro.

To my knowledge it would not be possible to directly link the two. The most likely port to use would be the RS 423, but I cannot see it being used without some sort of buffer hardware.

I must ask why you want to connect your BBC micro to a synthesizer? The synthesizer should have all the features you need. By comparison a computer is a very poor music maker and I cannot see how it can add to the synthesized sounds. Cassettes can be used to store the music in a normal audio fasion, while patch notes should be available to store the various configurations used to create the sounds.

There is a trap which, quite understandably, many people fall into. A computer is not a universal panacea that will do absolutely anything. Nor is there any real point in trying to do things with your computer just because you happen to have the bits there.

As for your problems in getting a copy of *Popular Computing Weekly* I have passed your letter on to our distributors. In the last few weeks, now that we have become established, circulation has been increasing which has led to some local problems. Problems we are overcoming by stepping up production.

Back issues are available except for issue two. If you write to us with a cheque or postal order for 50p per issue, we will be happy to send them to you. Mind you, the way to guarantee a regular copy is to place a regular order, or take out a subscription. It is well worth it.

STOP agonising over that nagging problem. Write to Ian Beardsmore at Peek & poke for the answer. Letters should be as brief as possible and include full name and address. Write to Peek & poke, *Popular Computing Weekly*, Hobhouse Court, 19 Whitcomb Street, London WC2 7HF

Competitions

Is your number high or low?

by Gordon Lee

The use of logarithmic functions to find powers and roots has been seen to bring its own problems when used with *If Then* statements (*PCW* July 15 Puzzle)

For a cube, the ** can be replaced by two separate *s (ie replace 3**3 by 3*3*3) Unfortunately it is not always possible to avoid using logarithmic functions — for instance in the case of cube roots If there is no easy way around the problem than the conditions of the *If Then* statement must be changed

In theory having found the cube root of our number we can just test to see if it is a whole number (integer) In practice we know that this value may be a bit out, and we have no easy way of knowing if it is slightly too high or too low If it is too high than

```
IF ABS(N-INT N)<0 000001 THEN
```

will work However if N is slightly too low

```
PRINT INT (27 ** (1/3))
```

gives a reading of 2

All is not lost. Since we know that the value to be tested might be slightly under the integer we add a small amount — eg 1E−8

If the value being tested was within this value of the integer it will now equal or slightly exceed that integer This we can test as above So the complete test necessary is

```
IF ABS(N-INT(N+1E 8))<0 000001 THEN
```

The amount added (1E−8) should be more than the possible error induced by the system and less than the limit of accuracy expected for the test.

Puzzle No 15

Professor Otto Hex the well known mathematician, recently moved house

In order to help him remember his new telephone number (he was rather absent-minded) he used the ages in years of his four offspring

To get the number he could either add the cube of Susan s age to the cube of Billy s age or add the cube of Lucy s age to the cube of Ronnie s age

What was Otto s new number? (He lives in a small village so the smallest possible solution is the correct one)

Rules

The winner of the puzzle will be the reader who, in the opinion of *Popular Computing Weekly* has submitted the best program

Entries should be marked clearly 'PUZZLE'

The closing date for the competition is Tuesday August 17

'GUILTY'

Solution to Puzzle No 12

The fourth and fifth lines of the poem tell us that this is a cryptarithm in which numbers are substituted for letters

As there are more than ten different letters in the names given each name should be treated separately Each name consists of three identical letters and three different letters — though with the identical letters placed in a different position in each case This means that we need to find eight six-digit numbers which are perfect squares which in each case have three identical digits in the positions indicated by the letters found in each of the names Also the remaining three digits must be different

The guilty party will be the one whose name 'code' number is the largest.

In the example below Lines 30 to 50 are used to test the name Beedle For the other names, the string locations (N$(1−6)) in Lines 30 to 50 should be altered

```
10 FOR N = 999 to 317 STEP - 1
20 LET N$ = STR$ (N * N)
30 IF N$ (2) <> N$ (3) OR N$ (2) <> N$ (6) THEN
   GOTO 100
40 IF N$ (2) = N$ (1) OR N$ (2) = N$ (4) OR N$ (2)
   = N$ (5) THEN GOTO 100
50 IF N$ (1) = N$ (4) OR N$ (1) = N$ (5) OR N$ (4)
   = N$ (5) THEN GOTO 100
60 PRINT N N * N
70 STOP
100 NEXT N
```

The largest possible squares in each case are

Beedle = 944784 = 972^2, DeVere = 190969 = 437^2 Farrer = 824464 = 908^2 Heeley = 900601 = 949^2, Lowell = 438244 = 662^2, Nanson = 151321 = 389^2 O'Toole = 565504 = 752^2 and Strutt = 902500 = 950^2

The largest of these is 944784 so Beedle did it

Winner of Puzzle 12

The winner is Ian Turtle, St John's Road, Ashby Scunthorpe South Humberside who receives £10

Solution to Crossword 12

Across 4 Robin 7 Spartan 8 Screen 10 Adana 12 Ruin, 13 Athlete 14 Xmen, 15 Clark, 18 Unborn, 20 Captain 21 Angel

Down 1 Spiderman 2 Ironman 3 Dan 5 Orc, 6 Ire 8 Super 9 Epidermis 11 Chain, 12 Replete 17 Bun, 18 Roe, 19 Man

Winner of Crossword 12

The winner is R Filleul Nunthorpe Road York, who receives £10

DEAR READER,

IT IS WITH GREAT REGRET THAT WE MAKE THE FOLLOWING ANNOUNCEMENT: SIDNEY PAIN, KNOWN TO MILLIONS AS 'CITIZEN' PAIN, IS MISSING.

HE WAS LAST SEEN BY HIS MOTHER CLIMBING THROUGH A HOLE IN HIS BEDROOM WALL. IT IS BELIEVED THAT HE IS SOMEWHERE WITHIN THE INTERFACE OF A MAINFRAME COMPUTER. EARLIER TODAY, A POLICE SPOKESPERSON SAID:

"WE ARE VERY CONCERNED ABOUT MR PAIN'S SITUATION. THOSE GOBS AND GREMLINS ARE TRICKY CUSTOMERS"

A COMPUTER IS HELPING THE POLICE WITH THEIR INQUIRIES.

WILL CITIZEN PAIN SAVE THE WORLD AND PRESERVE THE STATUS QUO?

STATE AS WHAT?

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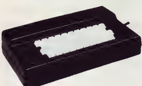
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